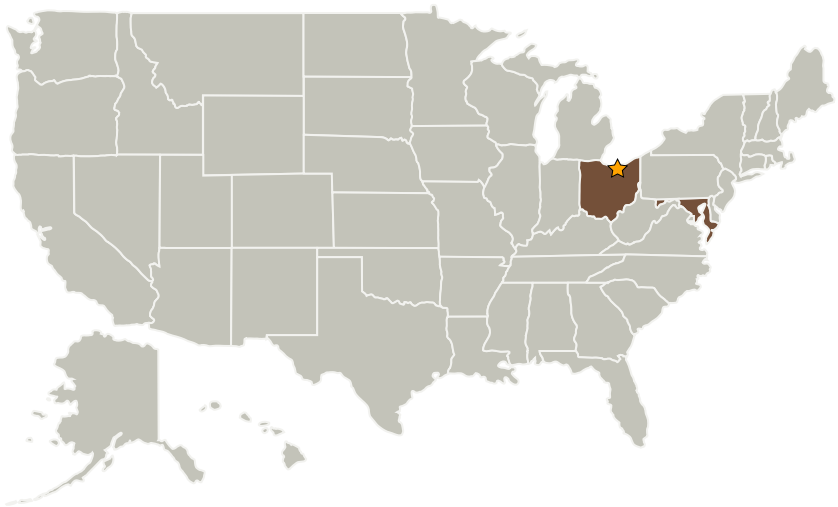
Ultra-Wideband Transceiver for Integrated Communication and Relative Navigation, Phase I

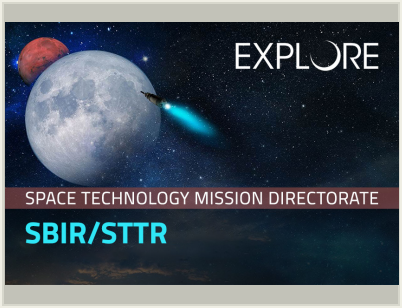
Completed Technology Project (2004 - 2004)

Project Introduction

The goal of this project is to develop an innovative way of using Time Modulated Ultra Wideband (TM-UWB) transceivers (radios) to provide high performance integrated communication and relative navigation. Many future near-earth or deep space missions requires spacecraft operating in a formation. A unified transceiver that can perform multiple functions is highly desirable. TM-UWB is an exciting new technology, whose small size, low power, robustness to interference, and very high data rate make it particularly useful for use on small satellites, and especially for satellites flying in formation because of simultaneous communication and range measurement capability. Under the Phase 1 work we will primarily address the design issues of UWB transceivers for integrated communication and relative navigation. The most important issue is the development and analysis of a high performance UWB communication/tracking scheme, which with current approaches can severely limit the achievable data rate and the update rate. IAI proposes a novel approach to allow the same update rate as the ranging-only cases and the same data rate as the communication-only cases. Under the proposed work we will develop the details of this scheme and analyze the system performance for integrated communication and relative navigation applications.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Chujen Lin

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.6 Optimetrics